

# Non Intrusive, On-line, Simultaneous Multi-Species Impurity Monitor in Hydrogen, Phase II

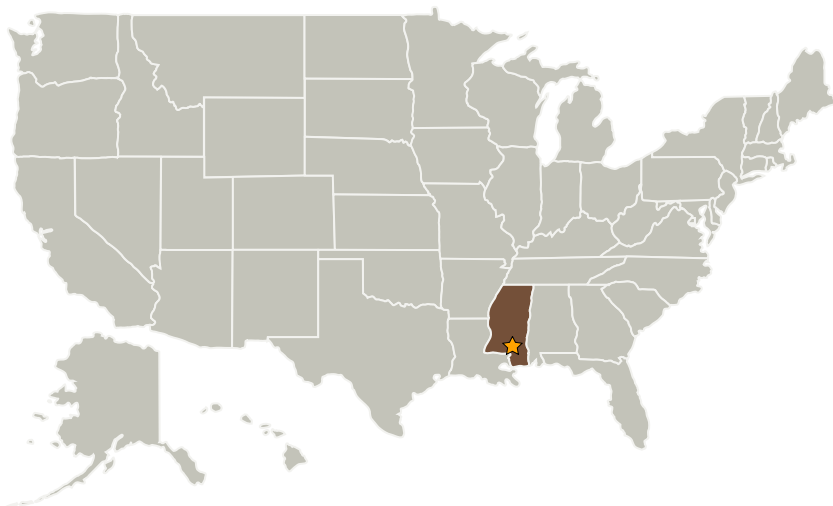
Completed Technology Project (2009 - 2011)



## Project Introduction

The purity of hydrogen fuel is important in engine testing at SSC. The hydrogen may become contaminated with nitrogen, argon, helium or oxygen. The hydrogen from the fuel tank s or feed lines is analyzed beforehand. Therefore, there is a need for a non-intrusive, on-line, near real-time monitor for H<sub>2</sub>. The analytical technique should measure various impurities (molecular and atomic) simultaneously and be easy to implement in the field. The objective of this proposed research is to develop an analytical technique based on Laser Induced Breakdown Spectroscopy (LIBS) to measure simultaneously the concentrations of nitrogen (N<sub>2</sub>), argon (Ar), Helium (He) and oxygen (O<sub>2</sub>) contaminants in hydrogen (H<sub>2</sub>) gas storage tanks and supply lines. Advanced sensors for monitoring multiple species in H<sub>2</sub> feed-lines and storage tanks will be useful before engine testing and will increase understanding of engine performance. Phase I has provided necessary information to build a sensitive, compact, sturdy, user-friendly and fieldable prototype in Phase II, with ease of implementation at NASA/SSC. In Phase II, a prototype LIBS system will be designed and fabricated to measure impurities in H<sub>2</sub> fuel at different places in the H<sub>2</sub> feed line. This integrated system will be delivered to NASA/SSC at the end of Phase II.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Stennis Space Center (SSC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi
Mississippi Ethanol, LLC	Supporting Organization	Industry	Winona, Mississippi

## Primary U.S. Work Locations

Mississippi

## Project Transitions

**June 2009:** Project Start**July 2011:** Closed out

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX13 Ground, Test, and Surface Systems
  - └ TX13.1 Infrastructure Optimization
  - └ TX13.1.3 Commodity Recovery